



Honeycutt KSC-bound

NSTS Deputy Manager Jay Honeycutt to leave JSC for Kennedy Space Center post. Story on Page 2.



Award-winning concept

"JSC/Gateway To The Stars" chosen as winning 1989 JSC picnic theme. Story on Page 4.

Space News Roundup

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From an angle wide enough to include *Discovery's* tail, all land features of South America's Amazon River basin are completely obscured by smoke.

Using the human advantage

Astronauts' photographs of Earth revealing

By James Hartsfield

Almost a third of a continent covered with smoke. A two-decade drought apparently ending, but lake levels still low. Barren ground where lush forests once stood. Irrigated fields in the tropics. Standing water in the Sahara Desert. These are some of the conditions photographed during the 26th Space Shuttle flight, the first opportunity Americans had to take handheld photos from orbit in more than two and a half years.

Earth photographs taken by *Discovery's* crew during America's return to manned space flight in 1988 were among the clearest in more than 20 years.

Although satellites also photograph these areas, photography from the Shuttle has an advantage. Crew members can spot interesting phenomena on their own and photograph them.

"A satellite looks straight down, and a ground controller has to tell it what to take a picture of," said Chuck Wood, manager of the NASA Space Shuttle Earth Observations Office at JSC. "But astronauts operate in a discovery mode; they're constantly watching for unusual conditions to photograph. Shuttle photos can be taken from all angles, have a variety of sun angles and can be on regular film, showing the true colors of the subject."

Personnel in the Earth Observations Office train flight crews in Earth photography, select targets of interest for such photography and analyze the results following each mission. Specialists in the office also conduct research on data gained from Shuttle photography about the environment, climate and geology of various regions.

Due to a totally unexpected rise in atmospheric clarity, visibility from STS-26 over the Northern Hemisphere was the best since the flights of the Gemini Program in the 1960s, Wood said. The *Discovery* crew could see more than 700 miles away from the Shuttle, much

farther than has been usual for Shuttle flights.

But the crew's most amazing sight passed directly below them as they photographed it: an estimated more than 1 million square miles of smoke shrouding South America's Amazon River basin, the result of tropical forest, pasture and cropland being cleared and burned. The ground was completely obscured by the dense white smoke. If placed over the continental United States, the smoke cloud would have covered an area of the country more than three times the size of Texas. It is the largest such smoke cloud ever photographed by astronauts, according to analysts in Earth Observations.

"All of us on the crew were fairly amazed at the size of the smoke pall over South America," *Discovery's* Pilot Dick Covey said. "There was total ... smoke from the Andes east, obscuring almost the entire continent."

Covey had the lead Earth Observations responsibility on STS-26. During the four-day mission, the crew took 1,505 photographs of Earth. *Discovery* was launched into an orbit that kept it above only the tropical and subtropical regions, as are the majority of Shuttle flights. But that orbit took *Discovery* over about half of Earth's surface, covering parts of 122 countries and regions that hold about 75 percent of the world's population.

Along with the Amazon basin, STS-26 photographed smoke clouds over Sumatra and Borneo, Indonesia, Madagascar, east Africa, northern Australia and Bolivia. The smoke clouds over some African areas, Madagascar, and Australia were probably the result of seasonal grassland burning, said Mike Helfert, an Earth Observations Office specialist in studies of tropical deforestation. The clouds over other areas, and the one over South America, were mostly the result of rain forest clearing.

Please see **SHUTTLE**, Page 3

Discovery rides into orbit again

By Kelly Humphries

Discovery and her crew of five proved Monday that NASA can take a serious technical setback, correct the problem and launch safely without compromising the Space Shuttle flight schedule.

Protecting a critical interplanetary launch window for Magellan, STS-29 Commander Michael Coats, Pilot John Blaha and Mission Specialists James Bagian, Robert Springer and James Buchli rode *Discovery's* towering column of thrust and smoke on a near-perfect launch beginning at 8:57 a.m. CST Monday.

After accepting a two-week delay for replacement of the three main engines' high pressure oxidizer turbopumps, *Discovery* and her crew had to endure one last nearly two-hour delay. The Monday launch, originally scheduled for 7:07 a.m., was pushed back by ground fog and unfavorable upper level winds.

The efforts of crews at Kennedy Space Center to remove and replace the turbopumps, which had shown signs of stress corrosion cracks in some of their bearing races, did not go unnoticed.

"It seems like a fitting time as we're passing over Florida and MILA again

to thank all the main engine people that did such a good job getting our engines in shape here," Coats said about 1 hour and 40 minutes into the flight as the crew awaited a "go" for orbit operations. "I'd like to thank some of the lead technicians, Leo Hicks, Darwin Westbrook, George Schram and Charlie Adams and ask them to pass on to all of their people a well done from all of us."

President George Bush made his first presidential telephone call to a spacecraft at 7:22 a.m. CST Thursday, congratulating the crew and all of NASA for the success of the mission.

"Let me simply say to everyone at NASA that you have our strong support," Bush said. "The space program, especially Space Station *Freedom*, is an investment in our future. We're living in tough budgetary times, but I am determined to go forward with a strong, active space program."

Coats told Bush that the crew was flying something for First Lady Barbara Bush responded with an invitation.

"She'll be thrilled. You'll have to come up and give it to her personally," he said.

Please see **DISCOVERY**, Page 4

Fletcher bids farewell

"Well done, team!"

Outgoing Nasa Administrator James C. Fletcher congratulated a packed house of JSC's NASA employees on their contribution to the agency's recovery from the *Challenger* accident over three years ago. "I've been proud to serve as your team captain," he said.

Over 700 employees greeted Fletcher with warm applause as he addressed them in Teague auditorium Thursday morning on the first stop of his final tour of NASA centers as administrator. Hundreds more heard his remarks live in their workplaces on NASA TV.

In his introduction, JSC Center

Director Aaron Cohen reminded his audience of the problems NASA faced at the time Fletcher was called back into service as the agency's seventh administrator by then-president Ronald Reagan in May, 1986. (Fletcher previously served as NASA's fourth administrator from 1971-77.)

"When Dr. Fletcher returned to NASA, we had technical problems, we had management problems, and we had budget problems," Cohen said. "He has taken great strides to get us back on track. He got the replacement orbiter, the shuttle returned to flight and he got the space station. He leaves

Please see **Fletcher**, Page 4

U.S., Soviets plan brisk exploration programs

During the 20th Lunar and Planetary Science Conference at JSC, the leaders of both the United States' and the Soviet Union's exploration programs promised increasingly aggressive activity, and scientists, engineers, astronauts and managers commemorated the 1969 lunar landing of Apollo 11 with a reunion banquet.

Lennard Fisk, NASA associate administrator for Space Science and Applications, and Valery Barsukov, academician from the Soviet Vernadsky Institute at the U.S.S.R. Academy of Sciences discussed complementary Solar System exploration missions at a special session Tuesday night in the Bldg. 2 Teague Auditorium.

Fisk concentrated on the upcoming Magellan and Galileo missions, an

upcoming Voyager encounter with Neptune, and the establishment of four great orbital observatories beginning with the Hubble Space Telescope late this year. He also discussed a joint JSC/Jet Propulsion Laboratory Mars Rover Sample Return Mission and Mars Orbiter.

"We're going to be awash in new science data and science discoveries," Fisk told an audience of about 300. "The flurry of activity is such that no one will question our leadership again."

Fisk stressed the importance of a fiscal 1990 new start on the CRAF (Comet Rendezvous Asteroid Flyby) mission and Cassini probe to Saturn and its moon, Titan. Changing orbital mechanics would prohibit the missions if there is any delay in their starts, he said. The CRAF mission would study the beginnings of our

Solar System by flying by the asteroid Hestia and shooting two penetrators into the nucleus of the Temple 2 periodic comet. Cassini would look at organic chemistry on the surface of Titan, believed to be similar to that of early Earth.

Barsukov received spontaneous audience applause when he produced slides of the Martian moon Phobos taken by the Soviet Phobos probe from a distance of 320 kilometers. He predicted an approach within 50 meters of the surface of Phobos during the first week of April, and deployment of two landing probes on the potato-shaped moon's surface.

During the next 10 to 15 years, Barsukov said, the Soviet Union's exploration program will concentrate on Mars, the Moon, small bodies of the Solar System and the planet

Mercury. Also, a Soviet lunar polar orbiter planned for launch in 1992 is expected to provide global survey data on the Moon in preparation for a lunar base—possibly in collaboration with the U.S.—during the first decade of the next century.

Barsukov also showed a 10-minute film of the Soviet's Mars rover model climbing over difficult terrain.

Barsukov and Samuel Keller, Fisk's deputy, said recent discussions about U.S.-Soviet cooperation in space science and exploration have resulted in a greater mutual understanding of the two countries' space programs and produced new hope for future cooperative ventures.

If cooperation continues, Barsukov said through his interpreter, "there will be no question who is behind and who is ahead—we will be both ahead."



JSC Photo by Scott Wickes

Valery Barsukov (right) presents Samuel Keller with meteorite samples at a special Tuesday night Lunar and Planetary Science Conference session.

JSC

People

Honeycutt accepts post at Kennedy

Jay F. Honeycutt, deputy manager of the National Space Transportation System (NSTS) Program Office at JSC, has been selected to be director of STS Management and Operations at Kennedy Space Center, pending NASA Headquarters' approval.



Honeycutt

The position previously was held by Kennedy

Deputy Director Thomas E. Utsman, who performed the duties of both offices.

Honeycutt, joined NASA at JSC, as a simulation engineer in the Flight Operations Directorate in 1966. He became technical assistant to the associate administrator for space flight in 1981, and was named manager of operation integration in the NSTS Program Office in 1982.

Following the *Challenger* accident, Honeycutt was temporarily assigned as an assistant to Rear Adm. Richard Truly, associate administrator for space flight. He coordinated the Presidential Commission on the Space Shuttle *Challenger* Accident and Congressional activities.

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m. to 2 p.m. weekdays:

General Cinema (valid for one year): \$3.50 each.

AMC Theater (valid until May 31): \$2.95 each.

Sea World (San Antonio, year long): adults, \$17.25; children \$14.75.

"Revival" (March 17, 8:15 p.m., League City Civic Center): \$5.

Easter Egg Hunt (March 25,

includes hunt, photo with Easter Bunny, magic show, petting zoo, clowns, jugglers, refreshments): adults \$1; children \$3.50 (tickets go on sale March 13).

Disney on Ice—Pinocchio (April 8, noon, Summit, on sale March 20): \$7.

JSC Night at Astroworld (April 7, 6 p.m.-midnight): \$6.95 for first 5,000, then \$8.95.

"Pericles, Prince of Tyre" (April 22-28, 8 p.m., Satellite Theatre, UHCL): \$4.

JSC

JSC

Dates & Data

Today

Fitness program—The JSC Health Related Fitness Program is accepting applications for its upcoming sessions. Enrollments are being accepted for the April 3-June 23 session (Monday, Wednesday and Friday, 11 a.m. and 4 p.m.); the July 3-Sept. 22 session (Monday, Wednesday and Friday, 6:30 a.m.); and the Sept. 25-Dec. 15 session (Monday, Wednesday and Friday, 11 a.m. and 4 p.m.). All sessions meet at the Gilruth Recreation Center. Application and a comprehensive physical examination are required six weeks prior to enrollment. Call x30301 or x30302 for more information.

Cafeteria menu—St. Patrick's Day special: corned beef, cabbage and new potatoes. Entrees: pork chop with yam rosette, Creole baked cod. Soup: seafood gumbo. Vegetables: Brussels sprouts, green beans, buttered corn, whipped potatoes.

Monday

AFCEA meets—The Armed Forces Communications and Electronics Association (AFCEA) will meet at 11:30 a.m. March 20 at the Rec Center. Lt. Gen. Donald L. Cromer, commander of Space Division, Air Force Systems Command at Los Angeles Air Force Base, will speak. Cost is \$8 for members; \$10 for non-members. Reservations are due March 17. For more information, call Debbie Williams, 282-4952.

Cafeteria menu—Special: Italian cutlet. Entrees: braised beef ribs,

chicken a la king, enchiladas with chili. Soup: cream of broccoli. Vegetables: Navy beans, Brussels sprouts, whipped potatoes.

Tuesday

ASME meets—The American Society of Mechanical Engineers (ASME) Aerospace Technical Chapter, South Texas Section, will meet at 6 p.m. March 21 at the King's Inn, 1303 NASA Road 1. Dr. Kumar Krishen, assistant director of technology and advanced projects for JSC's Mission Support Directorate, will speak on robotic vision for space application. Cost is \$10 with reservations. For reservations, call Sam Veerasamy, x31581, or Ed Carter, 333-6791.

Cafeteria menu—Special: stuffed cabbage. Entrees: potato baked chicken, barbecue spare ribs. Soup: beef and barley. Vegetables: corn cobette, okra and tomatoes, French beans.

Wednesday

NMA meets—The NASA/JSC chapter of the National Management Association (NMA) will be at 5 p.m. March 22 at the Rec Center. Henry W. Flagg Jr., JSC's chief counsel, will speak about the impact of pending legislation on future federal-to-private sector employment moves. Non-members who would like to attend should call Ann Hammond, x32933. For more information, call Gerald Chapman, x34848.

Astronomy seminar—The JSC

Astronomy Seminar will present an audiotaped discussion with Dr. Robert Kraft of the University of California, Santa Cruz, about the Keck Telescope at noon March 22 in Bldg. 31, Rm. 193. For more information, call Al Jackson, x33709.

BAPCO meets—The Bay Area PC Organization (BAPCO) will meet at 7:30 p.m. March 28 at the League City Bank and Trust. For more information, call Earl Rubenstein, x34807, or Ron Waldbillig, 337-5074.

Cafeteria menu—Special: pepper steak. Entrees: catfish with hush puppies, roast pork with dressing. Soup: seafood gumbo. Vegetables: broccoli, macaroni and cheese, stewed tomatoes.

Thursday

JAIPCC symposium—The 1989 Joint Applications in Instrumentation Process and Computer Control (JAIPCC) will be March 23 at the University of Houston-Clear Lake. Keynote speaker Robert H. Brown, chief of JSC's Technology Development and Applications Branch, will discuss "Technology Transfer: A Challenge in Automation." Reception speaker Dr. Michael Standford, senior research scientist for Krug International, will discuss "Space Radiation Environment: Implications in Manned Space Flight." Presentations will examine control systems, communications, artificial intelligence, life systems and energy systems. For more information, call Wade Webster, 282-6240, or Eddie Robinson, 333-7029.

Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2.

Property

Sale: Webster/Green Acres residential lot, 1/2 acre, all city util. avail., \$12,000, OBO. Boyd, x36866.

Lease: Friendswood 4-2-2, FPL, on the park, peach trees, fenced, \$600/mo., \$300 dep. 996-0981.

Lease: Baywind II townhome, 2-2-5, large two-story unit, approx. 1180 sq. ft., FPL, W/D, ceiling fans, pool, tennis, etc., \$490/mo. x30715 or 280-8608.

Sale: Friendswood/Heritage Park, 4-2-2, FPL, corner lot, cul-de-sac, landscaped, ceiling fans, miniblinds, built-ins, 2 yrs. old, fixed 8% FHA. Dee, x32425 or John, 996-8975.

Lease: Egret Bay condo, 2-2, FPL, W/D, covered parking, view of water, 1 yr. lease, \$415/mo. Jim, 280-1653 or 474-4177.

Sale/Rent: Lakeside condo, 2-1, 25' boat slip (motor or sail), tennis, lakeside pool/party pavilion, sauna and exercise facilities, \$39,000 or \$560/mo., util. incl. Carol, x39647 or 667-7023.

Sale: Friendswood/Forest Bend, 3-2-2, den, screened-in porch, ceiling fan, new paint, assume 9.5%, \$517/mo. Nick, x31920 or 996-7917.

Sale: West League City, 4-2-2, split floor plan, newly decorated kitchen, ceiling fans, track lights, custom drapes w/miniblinds, Jacuzzi w/deck, landscape lights, and much more, assumable 9.5% interest, no qual., will consider 2nd, \$64,900. x38013 or 332-4666.

Rent: Cancun, MX., villa, 5 star resort, sleeps 4, fully equipped kitchen, maid service incl., \$76/night from Jul 29 to Aug. 5, 1989. 729-0654.

Rent: Beach house near Galveston, front row, adjacent to San Luis Pass fishing pier, 2 BR, weekends or weekly. 894-0979.

Lease: Large 2 BR, near NASA, nice, \$350/mo. Eric, x38420 or Herb, x38161.

Sale: 38 acres between Cleveland and Dayton, TX., owner finance. Verna, x32209 or 480-5629.

Rent: Lake Livingston, waterfront, 3-2, fully furnished, covered decks, pier, new cond., wood FPL, ex. fishing, week or weekend. 482-1582.

Sale: Big Bend area hunting land, 160 acres, \$150/acre, CFD 20% down, 9% for 5 yrs. 337-4051.

Lease: Brentwood subd., 3-2-2, 1 blk. Hobby Elem., 3 blks. Madison H.S., 15 min. from Texas Med. Ctr., \$550/mo., 1 month dep. Myron H. Johnson, x37194 or 438-0201.

Rent: Backlit mobile home lot, \$85/mo., \$50/dep., 4421 4th St. and 4102 Kinne. 488-1758.

Sale: Cocoa Beach, oceanfront time-sharing condo, rated five-star, take over payments. Kelly, x31356 or 488-4870.

Lease: League City/The Landing, 4-2-2, near NASA, shopping centers, freeway, \$595 plus dep. 480-2870 or 282-2633.

Sale: University Green patio home, 2-2-2D, full sized study, 8' brick privacy fence, 5 blks. from JSC, executive home in perfect shape, \$98,000. 488-0397.

Sale/Lease/Rent: 10 acres on FM 517, 1/2 mi. west of Hwy. 146, 40 x 60 barn, 1 acre

of stocked ponds, util., and more. 484-7834.

Sale: 1982 14' x 72' Fleetwood Festival mobile home, 2-2, CA/H, appl., ex. cond., \$9,000, OBO. 474-4306 or 409-925-5554.

Sale: Friendswood/Sun Meadow Estates, wooded lot in estab. neighborhood, cul-de-sac, bordered by stream and golf course on 2 sides, approx. 245' deep and up to 88' wide, util. on site, \$31,500. Doug, x32860 or 486-7412.

Cars & Trucks

'71 Dodge Charger, A/C, power, auto., 318, new urethane paint, rechromed bumpers, no rust. 664-9472.

'74 Cadillac Coupe de Ville, A/C, P/S, P/B, P/W, P/seats, in good mech. cond., body needs work, \$800, OBO. 282-3307 or 486-4016.

'84 Ford Bronco, 4WD, 302, auto., A/C, P/S, P/B, tilt, cruise, AM/FM cass., 61K mi., ex. cond., \$6,950, OBO. Michael, 282-5443 or 863-8710.

'75 Olds Cutlass, runs good, new steel belted radial tires, \$350, OBO. Jim, x30296 or 488-0658.

'75 Mercury Marquis, 4 dr., 460 V-8, A/T, A/C, P/S, P/B, P/W, P/L, power seat, tilt steering, AM/FM tape, leather seats, runs great, \$1,250. Steve, x35028 or 488-2546.

'73 Ply. Valiant, 4 dr., slant 6, auto., A/C, 82K orig. mi., dependable, \$1,200; '80 Chev Blazer, 4 spd., 4WD, A/C, mags, Pioneer AM/FM cass., \$3,500. 332-0365 or 282-2802.

'80 Honda Accord, 2 dr., silver, red int., \$2,250. x39218 or 333-4137.

'84 Chevy van, P/B, P/S, A/C, AM/FM, auto., new paint, low mi. 482-6609.

'85 Dodge Omni GLH turbo, full roll cage, spare roller, eight wheels, less than 1,000 mi. on rebuild, \$3,000, spares nego. x32949.

'80 Monte Carlo, 2 dr., P/S, P/B, A/C, AM/FM cass. stereo, new tires, runs and looks good, nice int., \$2,000, OBO. x38145 or 651-1915.

'86 Dodge Daytona, black, runs good, sharp, sunroof, tape deck, low mi., \$5,700, OBO. Dave, 282-3522 or 996-8402.

'71 Lemans sport, one owner, 400 C.I.D., blueprinted, postrack, 400 T.H., etc., needs some work, \$2,700, OBO. Ron K., x34713 or 333-2273.

'84 Buick Regal Limited, V-6, plush int., cruise, tilt, P/S, P/B, A/C, AM/FM stereo, \$4,300. 930-8277.

'88 Chrysler LeBaron convertible, black w/ grey int., \$15,000. 333-6975 or 280-9844.

'84 Chrysler Laser, blue, 30K mi., 5-spd., A/C, sunroof, AM/FM, good cond., \$3,700, OBO. 333-6686 or 480-8772.

Cycles

'79 Yamaha XS 750 Special, 1 owner, windjammer, AM/FM cass., new tires, extras, \$1,100, OBO. Rich, x34818 or 480-8335.

'81 Yamaha 750 Seca, ex. cond., low mi., w/windshield and luggage rack, new tires, brakes, clutch and cables, \$1,050. Paul, 282-3267.

Two new Mopeds, pedal start, never used, street legal, top speed 30 mph, \$270/ea. or \$500 for both. Patel, x32103 or 484-5149.

'83 Yamaha Virago, less than 5,000 mi., ex. cond., \$900, OBO. Steve, 538-1624.

'88 Honda Hurricane 600, white/red, ex. cond., 4,300 mi., incl. matching Arai F-1 helmet, \$3,700. Michelle, x36792 or 326-3447.

Boats & Planes

'81 18' Sovereign sailboat w/trailer, 5hp motor, \$3,000. 487-5629.

'86 19.5' Bowrider-Sea Sprite, all options, 140hp Mercruiser I/O, total 25 operating hrs., \$8,500, OBO, will consider trade for pool contracting work, 538-3129.

'84 115 Johnson outboard power tilt and trim, \$2,200, OBO. 480-8274.

13-3 Boston Whaler, 50hp Evinrude, Motor-guide III, 3 pedestal seats rigged as bass boat or bay boat, 500. Doug, tilt trailer, ex. cond. 664-9472.

Audiovisual & Computers

Anyone who can run IBM ISPF Edit Macro from JCL, please call x37671.

Tandy 1000 w/color monitor, 1 disk drive, 128K, 1 game ex. cond., \$495. Lorraine, 480-3377, ext. 58.

Panasonic 10920 printer, \$275; Miniscribe 40MB hard disk, \$290; Genoa 800x600 Super Hires+ EGA card, \$175. Paul, x30222.

Orig. Compaq portable, 640K, 1-360K floppy drive, 2-20 MB shock mounted tandem drives, ports., 2-parallel, 1 serial, 1 game, external color monitor, \$1,500. Craig, 282-3731 or 485-5636.

Commodore 64 computer w/model 1541 disk drive, used approx. 20 hrs., software incl., \$350, OBO. 409-945-7584.

PC's limited turbo XT, 640K Ram, 2-360K floppies, 15 MB hard disk, EGA 640x350 board and monitor, math coprocessor, 1 serial and 1 parallel port, Star SG-10 printer w/LNQ, surge protector, software, \$1,400, OBO. Robert, x35485 or 554-7768.

IBM PC-Jr. w/expansion chassis, 384K RAM, 1-360K floppy drives, color monitor, 300 baud modem, parallel and serial ports, DOS 2.1, spreadsheet, manuals, \$600, OBO. Randy, x35711 or 485-2441.

IBM compatible XT, 640K, CGA monitor, 20 Meg hard disk, 101 keyboard, 2-360K floppy drives, 8 MHz turbo, serial, parallel, clock, 2400 baud internal, Norton SI = 3.1, ex. cond., \$995. 943-0113.

Household

Solid wood bedroom furniture, dresser w/ lighted mirror, chest, ex. cond., \$260. Patel, x32103 or 484-5149.

Bentwood rocker, dark varnished and dark rust color upholstery, \$35; footrest matches the rocker, \$10. Tamela, 430-8980, mornings or x36159 after 3 p.m.

GE washer, white, good cond., \$165. x37179 or 332-4780.

Sharp 19" color TV, ex. cond., \$210. Scott, x38093 or 333-1803.

Frigidaire 16 cu. ft. refrig./freezer, good cond., \$150. 488-2754.

Couch and loveseat, multi-colored green and gold stripe, good cond., \$100. Jan, 480-8190.

Queen size sofa/sleeper, Herculon, brown/beige, great cond., \$100. Bernie, x32515 or 486-4722.

Portable VHS recorder Quasar 5435 VCR, 531 tuner, 4 heads, 105 channel, wireless remote, 1983 model, well maintained, was \$950, now \$495. Bob, x36914 or 482-9241.

Daybed, bright floral, two back cushions, open ends, \$30. 280-8321.

Chrome/glass dinette set, 30" x 30", w/4 chairs, \$100. 486-8380.

24 cu. ft., side-by-side refrig./freezer, ex. cond., auto., defrost, countertop, \$160. Roy, x30720 or 488-4373.

Secretarial desk, 3' x 5', metal, wood formica top, ideal for P.C., \$150; 2 2-drawer metal file cabinets, \$20/ea. 482-6512.

Antique walnut dresser, \$125; antique chicken incubator, good for kitchen island/cutting board, \$90. Ann, 333-2524.

Antique sofa, new upholstery, \$100. 482-8820.

Wanted

Want last episode of "Cover Her Face," VHS or Beta. Jane, x37169 or 470-2744.

Van pool riders needed from Sugar Land, West Wood Mall, Fondren, to JSC area. Alice, x35234.

Need used spring maternity clothing, good cond., for working professional, size med. or 8-10. x31085 or 538-1218.

Need 2 riders for van pool, West Loop Park and Ride to NASA. Richard, x37557.

Want Starwars toys, figures and books. Ron, 482-1385.

Want bird cage and 10 gal. aquarium, reasonably priced. Brandon, 499-5786.

Want to trade \$8,000 electronic organ for land, car, truck, or boat of equal value, OBO. 337-4051.

Photographic

Gossen Lunapro light meter w/carrying case, very good cond., BO. Mike, x38169 or 482-8494.

Konica Autoreflex camera and lens, \$100, also other Konica lenses. x30577.

Konica FS-1 35mm auto. (AE) camera, Hexanon f-1.4x50mm, Hexanon f-3.5 35-70mm zoom, Tokina f-3.5 28-85mm zoom, flash unit, all cases, UV haze filters, very good cond., \$300. 482-8262.

Pets & Livestock

1 yr. old flat coated black Retriever, male, free to good home. 337-1896.

Neutered cat needs adult home, afraid of kids. 486-5563.

Cat needs good home, declawed, Calico, 1 1/2 yrs. old. 333-6216 or 488-1988.

Boxer pups, AKC registered, shots, wormed, tails/dew claws docked, fawn/white, some flashy, \$250-\$300. 488-3211.

Musical Instruments

Hammond organ, B-3000 console w/Leslie Speaker cabinet, great old time jazz and gospel sound, very good cond., avail. w/additional rhythm unit, \$4,000. 482-8262.

Yamaha console organ, 2 keyboards, all the extras, \$700. 480-2444.

Fender deluxe reverb II amp, Seiko quartz guitar tuner, Peavy guitar w/case, guitar stand, Ibanez tube screamer, \$400. 480-0024.

Kimball Spinnet piano, 15 yrs. old, ex. cond., \$900, OBO. Rich, x34818 or 480-8335.

Personal

The University of Houston is offering a new credit evening Spanish course at Regents Park, for information, call Christine Paul, 480-1603 or 488-9315.

Miscellaneous

'87 Bell Moto-4 Motocross helmet, red, w/visor, size 7 1/4, w/force flow, meets Sull '85, NSI 290, and DOT standards, ex. cond., \$80. 282-3307 or 486-4016.

Men's sport jacket, size small, was \$145, now \$50, worn once. Kathy, x36462 or 996-1410.

30 gal. oceanic aquarium w/light and stand plus all access., \$250, OBO. Carlos, x38879 or 554-7727.

Prom dress, floor length, white lace gown, strapless w/matching gloves, \$125. 482-8820.

Two surfboards, 76" Eaton Bonzer-Triffin, \$150 and 6'10" Southcoast Thruster w/leash and rag, \$250; one ATB mens 26" bicycle, ex. cond., \$75. 554-2320.

Camper shell, '81 Chevy long bed. 484-7834 or 280-4381.

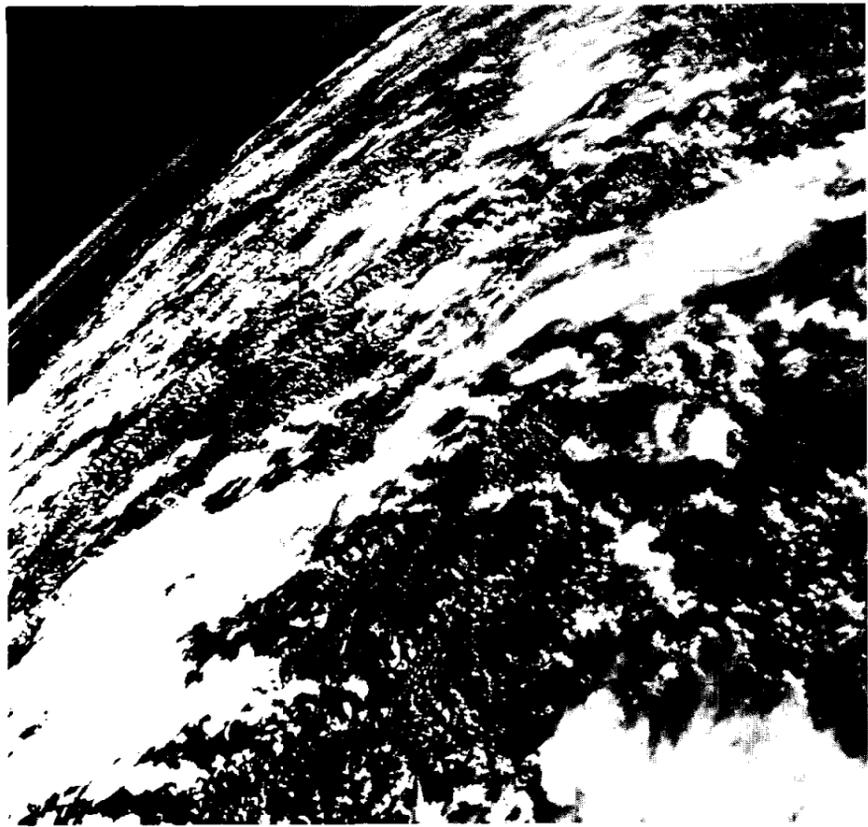
Ram Jr. golf clubs, woods 1 & 3, irons #3, 5, 6, 7, 9 w/golf bag, good cond., \$50; DP exercise bike, okay cond., \$20. Beth Ann, 333-6191.

Andrea raccoon, #5619, \$25. Linda, x34044 or 280-0909.

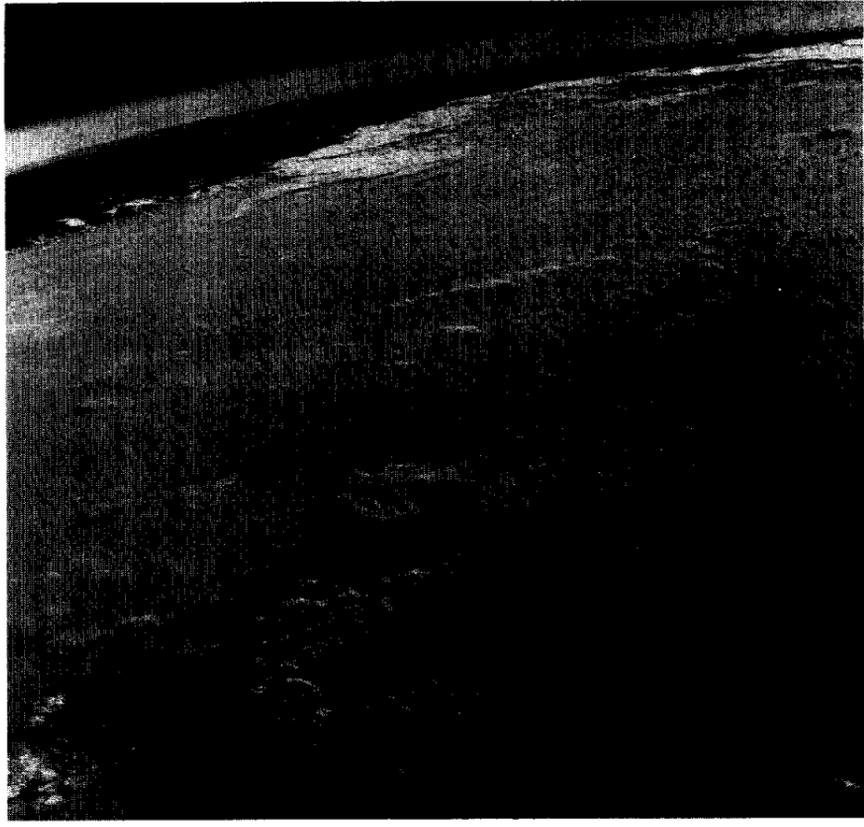
Golf clubs, new set, 1 and 3 metal woods, Tour Model System II irons, 1-9, PW, SW (peripheral weighted), putter and golf bag, \$300 or parts. David, 554-5514 or 282-3827.

Garment bag, heavy duty, leather straps, handles, two large zippered compartments, \$35. Linda, x34044 or 280-0909.

Biltmore size 7 cowboy hat, light brown, never worn, \$80; ladies size 7 1/2 cowboy boots, light rust, ex. cond., \$60. 946-3462.



South America's Amazon River basin is shown on a cloudy day during the 1973 wet season. The photo, taken during Skylab 2, looks east to west across the continent, with the Andes mountains rising near the horizon.



Amazon basin tropical rain forests are obscured by smoke from clearing and burning during the area's dry season. The photo, taken by the STS-26 crew in September 1988, shows a smoke cloud three times the size of Texas.

Shuttle photography uses human advantage

(Continued from Page 1)

The Amazon smoke cloud photographed by STS-26 was much larger than the previous largest smoke cloud over South America, seen during a 1984 Shuttle mission, Helfert said. Erosion in cleared tropical areas was evident in photography from STS-26, as it has been in photos from previous flights. It is filling rivers, lakes and bays with silt. Such erosion was "most marked in East Africa," he added.

STS-26 photos also showed evidence of irrigated fields in the southern Amazon basin—in an area that traditionally receives 100 inches of rainfall annually.

Across the globe from South America, photography from *Discovery* also captured effects that Wood calls "the greening of Africa." Africa, an area stricken by a 20-year drought, appeared to have had a season of heavy rains, judging from *Discovery's* photographs. Watery scenes from STS-26 were consistent with meteorological reports from the region.

In some photographs, standing water was seen in the Sahara Desert. In fact, the "green line" generally marking somewhat of a southern edge to the Sahara has moved farther north than it has been seen by astronauts since Gemini photography from 1966.

Africa's Niger River was in full flood during the mission, and photographs of the Blue and White Nile Rivers also showed evidence of recent flooding. Along the East African coast, many river mouths showed strong, silty plumes dissipating in the sea.

But two important gauges that have long been studied with space photography—Africa's Lake Chad and Lake Nasser—are still becoming smaller.

Since 1965, the surface area of Lake Chad has dropped by almost 95 percent, and STS-26 photography showed it to be at its smallest extent ever photographed by astronauts—despite the obvious heavy rains Africa has received, Wood said. Lake Nasser also was at a record low for astro-

naut photography.

The clarity of the atmosphere during *Discovery's* mission allowed objects not usually seen in Shuttle handheld photographs to be apparent: for the first time, an aircraft was photographed as well as its contrail; individual buildings could be seen in the Canary Islands; a line of electrical transmission pylons was seen in Southern Sudan; and oil platform flares were seen in the Gulf of Campeche.

The extreme Northern Hemisphere clarity may have been due to a lessening of volcanic dust in the upper atmosphere and the decrease of normally severe African dust and sandstorms, Wood said. "On some past flights, dust storms had extended from Africa halfway across the Atlantic. Astronauts couldn't see the water for the dust," he added.

The crew, all veteran astronauts, quickly became aware of the increased visibility.

"We were able to see great distances north of our track," Covey said. "During one

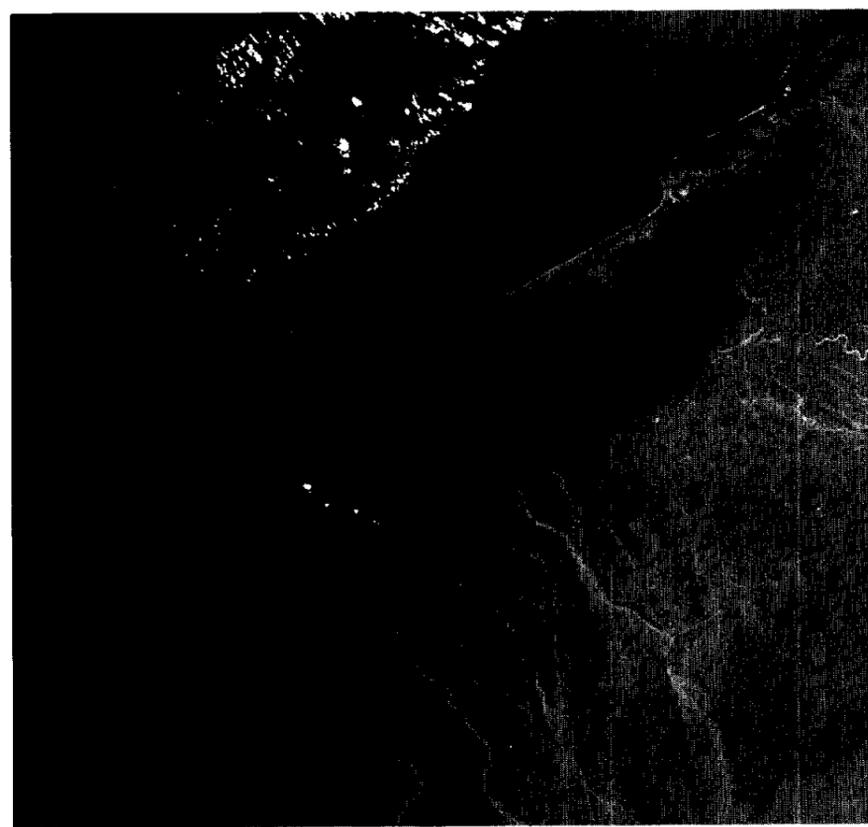
pass, I looked to the north to try to find Edwards Air Force Base, probably some 400 miles off our track. I found it, and I could make out the buildings, the ramp areas and details."

The STS-26 crew also photographed the effects of Hurricane Gilbert on the Mexican Gulf Coast and five volcanoes with signs of eruptive activity. But of all the photographs, the South American smoke cloud remains the most striking.

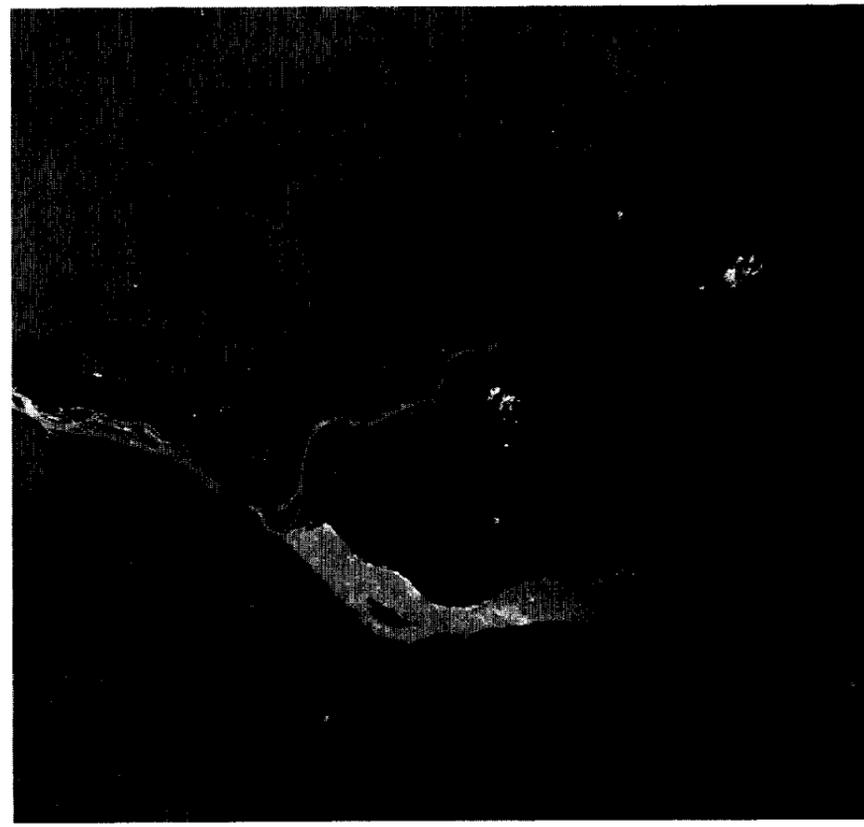
"There's one photo that is especially beautiful. The view stretches across the continent, and then there are the Andes Mountains, rising from the clouds," Wood said. "But then you realize that those beautiful clouds are really smoke."

That sense of ironic beauty also affected the space photographers.

"Circling the world every 90 minutes, you start feeling that the Earth just isn't as large as it seems on the ground," Covey said. "And you see that these things are really going to have an effect on the environment."



Vegetation near the coast of Oman in the Middle East is the greenest it has been seen in any Shuttle photography. The dark area, which is a deep green in color photos, is set apart from the light-colored desert in this STS-26 photo.



Africa's Blue and White Nile Rivers are full in this STS-26 photo showing evidence of recent flooding. A dam and reservoir can be seen in the lower right corner of the photo; past astronaut photography has shown a dry riverbed below the dam.

NASA, Japan to cooperate on space station

NASA Administrator Dr. James C. Fletcher and Japanese Ambassador H.E. Nobuo Matsunaga signed a memorandum of understanding (MOU) Tuesday for cooperation in the detailed design, development, operation and utilization of the permanently inhabited civil space station, which the U.S. calls *Freedom*. The agreement was signed at a brief ceremony at NASA Headquarters.

Comparable MOUs with the Euro-

pean Space Agency and Canada were signed, along with an intergovernmental agreement, in a ceremony held at the U.S. State Department last September. The MOUs signed between NASA and its three partners focus on programmatic and technical aspects of the cooperative effort and establish the management mechanisms necessary to carry out the *Freedom* program.

The MOU with Japan will become

effective upon written notification by each party that all procedures necessary for its entry into force have been completed. Until then, Japan will continue to work under an extension of the MOU signed with NASA in May 1985 at the start of the space station program's definition and preliminary design phase.

Under the agreements, Japan will provide the Japanese Experiment Module (JEM) to the *Freedom* pro-

gram. The JEM, to be permanently attached to the space station base, consists of a pressurized laboratory module, at least two experiment logistics modules and an exposed facility, which will allow experiments to be exposed to the space environment.

Experimenters will conduct materials processing and life sciences research in the laboratory module, while the logistics module can be used

to ferry materials between the station and Earth and for storing experimental specimens and various gases and consumables.

Space Station *Freedom* is an international space complex to be placed into orbit in the mid 1990s. The mission of the *Freedom* program is to provide for the U.S. and its international partners a diverse set of capabilities permitting humans to live and work in space for extended periods.

Welcome home ceremony planned at Ellington field

JSC and contractor employees, their families and guests are invited to welcome home the STS-29 crew and their families at Ellington Field about seven and a quarter hours after *Discovery* lands at Edwards Air Force Base.

The landing at Edwards is scheduled for 8:34 a.m. CST Saturday, and based on that time the crew would arrive at Ellington about 3:45 p.m.

JSC Director Aaron Cohen will preside over a 20-minute ceremony at Ellington that will begin immediately after landing at the east side of Hangar 990, the site of the STS-26 ceremony.

Everyone attending the ceremony will receive, upon arrival, an STS-29 crew return button. No other identification will be needed. The entire space in front of the platform will be open, with no special viewing areas set aside.

The Sam Rayburn High School Band will perform. Parking will be available on the west side of the hangar.

In the event that *Discovery's* landing time changes, updates on the welcome home ceremony will be available on the Employee Information Service telephone recording, x36765.

JSC aircraft maintenance, logistics contracts awarded

JSC has awarded two contracts, one for logistics support services and another for aircraft maintenance and modification.

The contract for logistics support services carried out at the center was awarded to Pioneer Contract Services Inc., Houston.

The cost-plus-fixed-fee contract provides for a basic year effort, plus four one-year options, totaling \$61.5 million. The basic year award is \$11.4 million, with the basic performance period extending through Feb. 28, 1990.

Northrop Worldwide Aircraft Services Inc., Lawton, Okla., was awarded a contract for maintenance and modification of JSC-assigned aircraft.

The work will be performed at Ellington Field, in El Paso, Texas, and Edwards Air Force Base, Calif.

The cost-plus-award-fee contract provides for a five-year period of performance, including four optional years, totaling \$77,950,743. The basic year award totals \$15,322,863. The contract also has flexible options which allow for an increase in hours of up to 95,542 hours each year.

Retiree badge use defined

Some recent questions about the privileges accompanying NASA "retired employee" badges have prompted JSC security officials to reiterate the policies associated with use of those badges.

Retiree badges are issued to retired JSC employees to allow them to visit former work areas that do not require physical control zone (PCZ) badging. The badges are valid for entrance through all JSC gates during normal operating hours and to JSC buildings from 7:30 to 5 p.m., Monday through Friday, excluding holidays. The badge also serves for access to the Gilruth Recreation Center any time recreational activities are scheduled.

Auto decals are not issued to retirees. They may gain entrance to the center by showing the guard their retiree badge at the gate. The badge does not authorize retired employees,

however, to use JSC streets for shortcuts between offsite locations.

Retirees who visit former work areas with unbadged individuals must have them follow standard temporary badging procedure. If the retiree desires to take groups on tours of non-public buildings, JSC Form 337 "Request for Unofficial Visitor Temporary Badging" must be completed, and a JSC sponsor at the division level or above in each building must approve the request.

A retired employee badge holder is not authorized to enter the center for the purpose of conducting commercial business. Retirees employed by NASA contractors or private companies must obtain temporary or permanent badges reflecting the name of the organization represented. Abuse of this security requirement can result in the withdrawal of retiree privileges and recovery of the badge.



JSC Photo

Janet Belanger (front center left) collects a \$75 savings bond from 1989 JSC Picnic Committee chairman Monica Kruest for her winning picnic theme entry. Picnic committee include (back row from left): Dave Heath, Dick McMinimy, Gloria Salinas, Mary Lee Meider, Mike Fohey, Alan Miyamoto, Rose Gardener-DeLapp, Mary Mueller, Dale Martin, (center row): Michelle Pringle, Britt Walters, John Marcucci, Mike Scott, Ginger Gibson, Melody Goss, Cindy Kohrs, Rockwell; (front row): Ann Patterson, Belanger, Kruest, Mary Wylie and Norma McMinimy.

Picnic committee adopts theme

"JSC/Gateway to the Stars" will be the theme of the 1989 JSC Employee Picnic, picnic committee members decided at a Feb. 23 meeting. The winning theme was submitted by Janet Belanger, a general clerk with Omniplan in Center Operation's correspondence section.

"This is where it (space exploration) starts," Belanger said, when asked to elaborate on the reasons

behind her theme suggestion. "I wanted to express that feeling—to recognize the hard work everyone here is doing to put us back on our way to the stars."

For her winning theme entry, Belanger will be awarded a \$75 savings bond, two tickets to the picnic, and two official 1989 JSC picnic committee t-shirts. The chosen theme will figure prominently into the selection of the band

and decorations for the annual picnic, which will be from 11 a.m. to 5 p.m. May 6 at the Gilruth Recreation Center. Tickets, which will cost \$3.50 for adults and \$2.50 for children, the same as last year, will go on sale in the Bldg. 3 employee cafeteria in mid-April and be available through May 3. The ticket price includes a Lenox barbecue lunch and most picnic activities.

Fletcher addresses JSC NASA employees

(Continued from Page one)
us with a space program that is successful, vigorous, and safe." Cohen said.

Fletcher opened his remarks by telling Cohen, "You are lucky to be director of a great NASA center like JSC. You owe me a debt, because I put you there!" he told Cohen and the appreciative audience.

"At that time we weren't sure where the space program was going, or where NASA was going. We weren't sure what role JSC would play. The nation owes you (JSC employees) a debt of gratitude," Fletcher said. "Well done, team!"

The administrator briefly listed

some of the agency's past achievements, and noted JSC's role in their success.

He predicted man will revisit the Moon, establishing a lunar base that may be temporarily, and later permanently, manned in much the same way bases in the Antarctic have been established. He looks forward to manned missions to Mars, which may eventually lead to permanent settlements there. "Some of you in this audience will be part of those projects," he predicted.

Fletcher reminded the audience of a similar visit he made to JSC shortly after his appointment, when a tense exchange between himself and a

questioning JSC employee regarding JSC's future role had caused him to stress that "JSC needed to learn to work together with the other centers."

"I regret that remark," he said Thursday, "and am here to congratulate JSC on the excellent way they have, under Cohen and Deputy Director P.J. Weitz, been an important part of the agency team."

Fletcher, expecting the appointment of his successor by President Bush in less than two weeks, closed his farewell address by telling employees "Of course you're the best center in NASA," and added with a wry grin, "when I go to Marshall, I'm going to say the same thing!"

Discovery landing set for Saturday morning

(Continued from Page 1)

The "clean as a whistle" launch grew into a relatively trouble-free first mission of the year. The STS-29 primary payload, a Tracking and Data Relay Satellite (TDRS) that will become the third in a constellation of on-orbit communications satellites, was deployed from the payload bay at 3:12 p.m. The first-stage burn of TDRS's inertial upper stage (IUS) booster took place about an hour later, propelling the satellite to within 0.8 feet per second of the expected velocity and eliminating the need for a trim adjustment. The second stage burn occurred about 12 and a half hours into the mission, placing the satellite into a 23,000-nautical mile geosynchronous orbit.

After achieving orbit, the crew and flight controllers discovered some unusual pressure fluctuations in cry-

ogenic hydrogen tank No. 3, which threatened to shorten the mission by a day. The cryogenic hydrogen and oxygen tanks feed the Orbiter's fuel cells, which provide power for the Shuttle. The suspect tank was shut down, and the crew was asked to power down some nonessential systems to maintain as many options as possible.

As flight controllers at JSC studied the phenomenon, they discovered that similar readings had been received from *Discovery* during STS-26, and traced the problem to erratic heater operations. The two heaters are used to adjust the pressure of the liquid hydrogen in each tank and force the hydrogen into a pipe that carries it to the fuel cell. At two days, two hours into the mission, the crew activated heater B in tank No. 3, and the system

operated normally.

There also were some problems with the Space Station Heat Pipe Advanced Radiator Element (SHARE), a first-of-its-kind potential cooling method for Space Station *Freedom*. SHARE, which uses convection of vaporized ammonia to dissipate heat into space, was shut off about two hours into the experiment when the electric heaters evaporated the ammonia faster than it could recirculate. Vapor bubbles in SHARE's liquid passage were identified as the probable culprit. Work on SHARE was continuing at Roundup press time.

A few minutes before the crew was to be awakened on flight day four, they surprised Mission Control with some wakeup music of their own. Leading off with the theme from the television and movie series "Star Trek," the

wakeup downlink featured a rousing introduction by William Shatner, who starred as Capt. James T. Kirk of the series' *Starship Enterprise*. CAPCOM David Low responded by playing the scheduled wakeup call, a medley of the crews' school flight songs from the U.S. Naval and Air Force Academies, and Drexel University in Philadelphia.

Later that day, during a test of the Text and Graphics System that will be used to uplink photographs and graphics on future missions, a copy of the Space News Roundup was sent to *Discovery*. CAPCOM Pierre Thuot said the transmission marked the first delivery of a newspaper to an American spacecraft.

Landing was scheduled to occur two orbits early on revolution 80, which would put touchdown at Edwards Air Force Base at 8:34 a.m. Saturday.

Space News Roundup

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